CHAPTER 3

ECONOMETRICS PROCEDURES AND RESULTS

As this study is conducted to investigate the determinants of the bilateral inward Foreign Direct Investment inflows among East Asian nations, Eclectic Model is used as a foundation for the study of inward FDI determinants for the countries in the region. Meanwhile, the gravity model is applied to check if the distance between the host country and the investing country determines the value of investment inflows.

Samples

Eight countries, out of fifteen, are selected as the samples for the model. The selection is based on the reliability of the information needed and the performance of the countries as a recipient of inward FDI in the region. Several countries, such as Laos, Burma, Cambodia, have to be excluded from the study as the study believe that those economies comprised of a high portion of informal sectors. As a result, data collection is doubtable and does not meet the prerequisite. Several nations, such as Taiwan, and Macoa, also have to be excluded as most of the statistics of those nations are either not combined to China, or not reported. Japan and Singapore, which are regarded as a major players in international investment community are also excluded for the study as the countries reported very low inward FDI from the

other East Asian countries. In total, the samples then consist of 8 host nations, which are;

China	Hong Kong, Province of China
Indonesia	Rep. of Korea
Malaysia	Philippines
Thailand	Vietnam

Assumptions of the Study

In this study, the model is constructed based on two key assumptions, which are;

1. Labor in every country is homogeneous.

2. Technology is counted as a capital.

Thus, level of labor productivity can imply level of technology availability in each nation. Moreover, the relative number of working forces of the two nations can imply the abundant of the labor.

Data Obtaining

In the study, Inward FDI of country i^{th}, the host country, from country j^{th}, the home country, is collected according to the provided data in World Investment Directory, UNCTAD. The time horizontal for all data collected is the year 1996, the latest possible data. Please be advised that the year 1996 is only one year prior to the Asian economic crisis, 1997.

Econometrics Procedures & Hypotheses of the Study

In the study, the Eclectic Model is basically used as a foundation of the study while well-known neo-trade theory, the gravity model, would also be applied. And according to the models, the study investigates the validity of the foundations under three main hypotheses.

1. Market Size hypothesis

According to the Eclectic Model, the proprietary advantage encourages firms to invest in a country where there is less proprietary to acquire higher profit, induced by corporate know-how and economic rent. (John H. Dunning and Norman G., 1987) By this, it is expected that a higher difference between the countries' market size shall encourage more FDI as investing foreign firms can enjoy higher advantage against local producers. As a result, the market size hypothesis aims to investigate the mentioned relationship by employing the market size of the countries as a proxy for the home country's proprietary asset.

By the concept mentioned above, the study exploits the relative economic size, measured by the country's GDP, of the host over the home as a tested variable. The value of the variable tends to be smaller when higher difference between the two countries' market sizes is reported. As a result, it is expected that the smaller value of the variable shall encourage higher foreign inward investment, leading to a negative relationship between the factors.

2. Cost-efficiency Hypothesis

In addition to the market size hypothesis, which aims to investigate the validity of the proprietary advantage, the study also observes the validity of the location advantage. The location advantage, as described in the previous chapter, can be induced either terms of higher demand (bigger market size) or lower cost of production. Meanwhile, firms, as profit-maximizing economic agents, must ensure first the total cost of settling that new affiliate shall not be greater than the overall cost if it produces and exports from the existed affiliate so they can enjoy higher profit (Horst, 1971). As a result, the study employs a number of variables as proxies for comparative cost advantage.

The study uses a relative number of populations of the two countries, again, the host over the home, as a proxy for labor cost advantage. It is hypothesized that the higher ratio should reflects the more abundance of labor in the host country, compared to the home, leading to a lower cost and higher investment inflows to the host country. As a result, positive relationship between the factors is expected.

A difference of the host country's cost of funding, measured by one-year lending interest rate of the host country minus that of the home country, is also applied as a representative for the cost hypothesis. The study expects a negative relationship between the factors as the higher funding cost of the host country should discourage the country's attractiveness.

In addition, the difference of the two countries' growth in the whole sale price, or Whole Sale Price Index, is used as another proxy for the cost hypothesis. Positive relationship is expected as the higher growth of sales in

the host country should allow firms to enjoy higher margin from the production.

3. Export Hypothesis

Export hypothesis is proposed here, under the location advantage of the Eclectic's Model, to investigate if the export performance can make a country more attractive location to international investors. As a result, the study employs the export performance, either measured by export value, or export value over the country's GDP, of the recipient countries other proxies for location advantage. Meanwhile, positive relationship is hypothesized.

In addition to the mentioned proxies and hypothesis, the study initially investigated the relationship between a country's inward foreign direct investment and other economic variables. The variables are, for example, the relative Per Capita Income of the home and the host country, the relative productivity of labor of the two countries. However, after running the model, the study cannot conclude that some of the proxies significantly determine the value of inward FDI to a host country and can be omitted from the model. As a result, the host country's Per Capita Income, its productivity of labor, and the distance between the host and the home country are excluded from the model. Finally, the study concludes that the following model determines the value of inward FDI to an East Asian country:

$$ID_{ij} = \beta_0 + \beta_1 DGDP_{ij} + \beta_2 DPOP_{ij} + \beta_3 DINT_{ij} + \beta_4 DWPI_{ij} + \beta_5 EXCOMP_j + \varepsilon_{ij}$$

Dependent variable is ID_{ij}, which is denoted for the Inward FDI of country i^{th}, the host country, from country j^{th}, the home country. $DGDP_{ij}$, is a independent variable that is a proxy to represent the proprietary advantage of the home country, compared to the host country. The data is computed as a ratio of the host country's GDP over the home country's GDP. By this, the difference of the countries' richness will definitely affect the variable. To illustrate, when, in comparison, the home country's economy is getting more advanced and the country can acquire higher proprietary asset, shown in GDP, the value of the variable tends to be smaller. Meanwhile, according to the Eclectic Model, the home country should enjoy the higher assets and invest more, leading to higher value of inward FDI to the host country (higher ID_{ij}). As a result, the relationship between the variable to the dependent variable is expected to be a negative sign.

In addition to the proxy for proprietary advantage, $DPOP_{ij}$, $DINT_{ij}$, $DWPI_{ij}$ are used as proxies for location cost advantage. $DPOP_{ij}$ is a relative value of the host country's population, which is strongly related to the country's labor forces, to the home country's population. The variable shows comparative abundant of population, labor forces, between the two countries. According to the Eclectic model, the host country shall be able to attract more FDI when the country provided investor with lower labor cost, induced by the comparative abundance of labor. By this, it is expected that when the amount of population of the host country increases, in comparison to the home, (or when the value of the variable increases, the value of inward FDI to the host country is increased, leading to an expectation for positive relationship between the variables. In addition, $DINT_{ij}$ is a notation for the difference

between the interest rates of the two countries, the host country's rate minus the home country's. One-year official lending interest rate is used in the study as the proxy for firms' cost of funding. As a result, negative relationship is expected as the higher cost of funding in a host country, compare to the home, should discourage international investors, who always looking for profit maximizing. Meanwhile, $DWPI_{ij}$ is a notation for the difference of the price levels between the two countries, the host's minus the homes. The study employs the Wholesale Price Index (WPI) as the proxy for the variable in order to reflect the relative revenue growth of the firm in the two countries. And according to the economic assumption, firms should prefer to invest in a place that reports a high revenue growth. As a result, when the growth in the host country is higher that in the home, the value of the variable should increase and induces to an increase in the host country's inward FDI. By this, positive relationship is expected.

In addition to the location cost advantage, the study employs the host country's export competitiveness, $EXCOMP_i$, as a proxy for location export advantage. $EXCOMP_i$ is the variable that is used as a proxy for location export advantage. The variable is a notation for the host country's competitiveness on the global market, measure by the host country's exports, as a proportion to its GDP. The variable is used to avoid the problem that export value is related to the country's economy size. However, the expectation of the relationship reported is still positive as international investors should look to invest in a country that reports greater export competitiveness.

Econometric Results

According to the procedures stated above, the study carries out the econometric calculation and report result as in Table 8.

According to the econometric result, the model is valid as it reports a high F-statistic where neither multi-colinearity, auto-correlation, nor heteroschedasticity is reported. The model reports the value of 4.9874 for F-statistic. By this, the model is econometrically valid at 0.0008 level of significant.

However, the model is quite weak as it reports only 0.2591 adjusted R-squared. The statistic implies that the presented model, with the stated variables, can describe the pattern of East Asian inward investment only by 25.91%, which is considered low. As a result, the study is extended to observe dynamic behavior of East Asian inward investment, in a longer run, in chapter 4.

Table 8 : Econometric Result

Dependent Variable: ID

Method: Least Squares

Sample(adjusted): 1 64

Included observations: 58

Excluded observations: 6 after adjusting endpoints

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	2607.154	1401.192	1.860669	0.0684
DGDP	-501.2413	332.6353	-1.506880	0.1379
DPOP	47.33905	12.24609	3.865645	0.0003
DINT	-1.958421	96.55017	-0.020284	0.9839
DWPI	124.3782	105.5720	1.178136	0.2441
EXCOMP	-1535.612	1778.361	-0.863499	0.3918
R-squared	0.324122	Mean dependent var		2000.955
Adjusted R-squared	0.259133	S.D. dependent var		4362.897
S.E. of regression	3755.303	Akaike info criterion		19.39742
Sum squared resid	7.33E+08	Schwarz criterion		19.61057
Log likelihood	-556.5253	F-statistic		4.987384
Durbin-Watson stat	1.683206	Prob(F-statistic)		0.000834

Software: Eviews

Econometric Interpretation

According to the econometric results, the study cannot reject that i) the relative size of the economies, ii) the relative amount of labor, iii) the difference in cost of funding, iv) the difference of the growth of wholesale price, v) the export value of the host country, and vi) the export competitiveness of the host country are determining factors for East Asian inward foreign direct investment. And among the factors, the relative size of the economies and the relative amount of labors are the significant determinants.

The relative size of the economies, with is represented by the ratio of the host country's GDP over the home country's, is reported as a negative determinant of the value of inward FDI to a host country. This relationship implies that a host country would receive higher inward FDI when the ratio is smaller. Therefore, the study reports that the value of inward FDI to a country is positively subjected to the size of the home country's economy, compared to the host country's economy. In other words, when the investing country and the recipient country are not much different in market size, which refers to proprietary assets, the value of net investment inflows between the countries tends to small. Also, the study reports that the value of inward investment of a country decreases as the recipient country's economy is more advanced than the investing country's economy. As a result, the study concludes that the comparative proprietary assets between countries significantly determine the value of the flows, therefore the market size hypothesis and Dunning's proprietary advantage are reaffirmed.

In addition, the study reports that the relative amount of the population of the two countries also determines the value of inward investment to a country. By this, the comparatively higher amount of population of the host country, compared to the home, encourage investments as it implies bigger market size, economy of scale, more abundance of labor, and, also, lower cost of labor. As a result, the factor, as a proxy for location cost advantage, and the study's cost hypothesis are significantly supported.

Nevertheless, it is remarkable that the model reports only 25.91% goodness of fit. This statistics implies there should be more factors, or models, that determine the value of the inward investment flows in the region. As a result, further study should be required, for the better understanding on the explanatory factors of the flows.

In conclusion, the study accepts that the comparative proprietary asset of country is a significant determining factor for inward FDI. Meanwhile, the other economic factors, which affect location advantage/disadvantage, such as cost-related factors and export performance, are also determine the flows. However, all in all, the whole model takes only a small role in explaining the behavior of the flow so there are rooms for further study, concerning FDI determinants.

Summary

The study has applied the data of selected countries during the year 1996 to investigate the relationship between determinants and inward foreign direct investment. The study aims to reaffirm the market size hypothesis and

find out if there is any other major economic factor that influent the flows. The study also investigates if the distance between two countries determines the value of inward FDI as it does for international trade.

The econometric result accepts that traditional hypotheses of FDI determinants are still valid. The negative relationship between the relative market sizes of the host country over the home country supports the ownership advantage. The reported relationships also support the cost-efficiency hypothesis and the export hypothesis. In a linkage, Dunning's Eclectic Model concerning proprietary advantage and location advantage is reaffirmed.

However, distance between the investing country and the recipient does not reported as a determining factor. As a result, the gravity model is not supported.

Nevertheless, the model reports low adjust R-Squared statistic. This implies that there should be several other factors that determine the value of the flows. As a result, the study, further study should be conducted for better understanding about the region's inward FDI determinants. By this, in the next chapter, the study would investigate and analyze a dynamic relationship between the value of the flows and the factors.